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Indian Standard

COMPARISON OF INDIAN AND OVERSEAS STANDARDS FOR IRON CASTINGS

PART I GREY IRON CASTINGS

(First Revision)

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COMPARISON OF INDIAN AND OVERSEAS STANDARDS FOR IRON CASTINGS
PART I GREY IRON CASTINGS
(First Revision)

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Indian Standard

COMPARISON OF INDIAN AND OVERSEAS STANDARDS FOR IRON CASTINGS

PART I GREY IRON CASTINGS

(First Revision)

0. FOREWORD

0.1 This Indian Standard (Part I) (First Revision) was adopted by the Indian Standards Institution on 24 November 1978, after the draft finalized by the Cast Iron and Malleable Cast Iron Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This standard was first published in 1966. The Sectional Committee has decided to revise the standard because most of the overseas standards covered have been revised.

0.2.1 The Indian Standards Institution has formulated specification for different types of iron castings used in the industry. It was, therefore, decided to publish comparison on Indian and overseas standards for various types of iron castings in separate parts so as to facilitate users and manufacturers to take full advantage of it.

0.3 This standard is the first in series and covers the comparison of Indian and overseas standards for grey iron castings.

0.3.1 This comparison includes Indian (IS), International (ISO), British (BS), German (DIN), French (AFNOR), Israel (SI), Russian (GOST), Swedish (SIS), American (ASTM), Italian (UNI), Czechoslovakian (CSN), and Japanese (JIS) standards for grey iron castings.

0.4 The comparison represents the position with regard to Indian (IS), International (ISO), British (BS), German (DIN), French (AFNOR), Israel (SI), Russian (GOST), Swedish (SIS), American (ASTM), Italian (UNI), Czechoslovakian (CSN) and Japanese (JIS) specifications existing at the time of publication.

1. SCOPE

1.1 This standard (Part I) compares grey iron castings included in IS : 210-1978* with International (ISO), British (BS), German (DIN), French (AFNOR), Israel (SI), Russian (GOST), Swedish (SIS), American (ASTM), Italian (UNI), Czechoslovakian (CSN) and Japanese (JIS) standards (*see* Table 1).

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*Specification for grey iron castings (*third revision*).

TABLE 1 COMPARISON OF INDIAN AND OVERSEAS STANDARDS ON GREY IRON CASTINGS

(*Clause* 1.1)

COUNTRY/ INTERNATIONAL ORGANIZATION	STD DESIGNATION	GRADE	SECTIONAL THICKNESS OF CASTING (mm)	DIA OF CAST TEST BAR (mm)	TENSILE STRENGTH *Min* MPa (kgf/mm^2)	BENDING STRENGTH *Min* MPa (kgf/mm^2)	BRINELL HARDNESS *HB*	TRANSVERSE TEST			DEFLECTION *Min* (mm)	CHEMICAL COMPOSITION
								Breaking Load, *Min* (kg)	Transverse Rupture Stress, *Min* MPa (kgf/mm^2)	Distance Between Supports (mm)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Grades Comparable to FG 150 of IS : 210-1978												
INDIA	IS : 210-1978	FG 150	—	30	150	—	130 to 180	←———Optional———→				—
ISO	ISO/R 185-1961	10	—	30	100 (10)	—	—	—	—	—	—	—
		15	—	30	150 (15)	—	—	—	—	—	—	—
UK	BS 1452 : 1961	10	Up to 9·5	15·2	173 (17·3)	—	—	195	313 (32·3)	229	—	—
			>9·5 to 19	22·2	165 (16·5)	—	—	442	303 (31·3)	305	—	—
			>19 to 29·6	30·5	157 (15·7)	—	—	744	294 (30·4)	457	—	—
			>29·6 to 41·3	40·6	150 (15·0)	—	—	1 700	284 (29·4)	457	—	—
			>41·3	53·3	142 (14·2)	—	—	2 767	273 (28·3)	610	—	—
WEST GERMANY	DIN 1691-1964	GG-10	—	30·0	100 (10)	—	—	—	—	—	—	—
		GG-15	—	13	220 (23)	—	—	—	330 (34)*	—	—	—
			—	20	180 (18)	—	—	—	310 (32)*	—	—	—
			—	30	150 (15)	—	—	—	290 (30)*	—	—	—
			—	45	110 (11)	—	—	—	260 (27)*	—	—	—
FRANCE	NF A-32-101-1965	Ft 10	—	30	100 (10)	—	—	—	—	—	—	—
		Ft 15	—	13	150 (15)	—	—	—	—	—	—	—
ISRAEL	SI 67-1973	10	—	20	—	—	—	—	—	400	—	—
			—	30	100 (10)	—	—	—	—	600	—	—
			—	45	—	—	—	—	—	900	—	—
		15	—	—	180	—	—	—	320	400	—	—
			—	—	150	—	—	—	300	600	—	—
			—	—	110	—	—	—	270	900	—	—
USSR	GOST 1412-1954	Сч 12-28	—	—	120 (12)	270 (28)	143-229	—	—	300 or 600	in 600 mm in 300 mm 6 2	—
		Сч 15-32	—	—	150 (15)	310 (32)	163-229	—	—		8 2·5	—
		Сч 18-36	—	—	180 (18)	350 (36)	170-229	—	—		8 2·5	—

SWEDEN	SIS 140 110- and 140115-1976	0 110	—	—	100	—	100-180	—	—	—	—	Specified (*see* Note 3)
		0 115	—	—	150-250	—	130-190	—	—	—	—	
USA	ASTM A-48-1976	20 A	—	22·4	138	—	—	—	—	—	—	—
		25 A	—	22·4	172	—	—	—	—	—	—	—
ITALY	UNI 5007-1969	G 10	3·5-7·5	15	160 (16)	—	215	—	—	—	—	—
			>7·5-15	30	100 (10)	—	175	—	—	—	—	—
			>15-30	60	—	—	—	—	—	—	—	—
			>30-50	90	—	—	—	—	—	—	—	—
		G 15	3·5-7·5	15	200 (21)	—	225	—	—	—	—	—
			>7·5-15	30	150 (15)	—	185	—	—	—	—	—
			>15-30	60	130 (13)	—	165	—	—	—	—	—
			>30-50	90	—	—	—	—	—	—	—	—
CZECHO-SLOVAKIA	CSN 4224 10-1974	4224 10	4 to 8	15	150	—	150-210	—	—	—	—	—
			>8 to 15	20	130	—	130-190	—	—	—	—	—
			>15 to 30	30	100	—	120-180	—	—	—	—	—
			>30 to 45	45	70	—	110-170	—	—	—	—	—
			>45 to 80	60	50	—	100-160	—	—	—	—	—
	CSN 4224 15-1974	4224 15	4 to 8	15	200	—	170-230	—	—	—	—	—
			>8 to 15	20	180	—	150-210	—	—	—	—	—
			>15 to 30	30	150	—	140-200	—	—	—	—	—
			>30 to 45	45	120	—	130-190	—	—	—	—	—
			>45 to 80	60	100	—	120-180	—	—	—	—	—
JAPAN	JIS G 5501-1976	FC 10	4 to 50	30	100 (10)	—	201 *Max*	700	—	—	3·5	—
		FC 15	4 to 8	13	190 (19)	—	241 *Max*	180	—	—	2·0	—
			>8 to 15	20	170 (17)	—	223 *Max*	400	—	—	2·5	—
			>15 to 30	30	150 (15)	—	212 *Max*	800	—	—	4·0	—
			>30 to 50	45	130 (13)	—	201 *Max*	1 700	—	—	6·0	—

NOTE 1 — The values given in the table are in MPa. In case values are specified in any other unit in the relevant standard, its equivalent in MPa is specified and the original values are given in parentheses.

NOTE 2 — For the detailed requirements of a standard, the original specification should be referred.

NOTE 3 —

Grade	Ceq $\%C + \frac{\%Si}{4} + \frac{\%P}{2}$	C percent	Si percent	Mn percent	P_{Max} percent	S_{Max} percent
0 110	4·3-4·7	3·5-3·8	2·8-2·2	0·4-0·8	—	—
0 115	4·1-4·5	3·4-3·7	2·6-2 0	0·5-0·8	0·5	0·15

*Transverse strength is the average value.

(*Continued*)

TABLE 1 COMPARISON OF INDIAN AND OVERSEAS STANDARDS ON GREY IRON CASTINGS — *Contd*

COUNTRY/ INTERNATIONAL ORGANIZATION	STD DESIGNATION	GRADE	SECTIONAL THICKNESS OF CASTING (mm)	DIA OF CAST TEST BAR (mm)	TENSILE STRENGTH *Min* MPa (kgf/mm²)	BENDING STRENGTH *Min* MPa (kgf/mm²)	BRINELL HARDNESS *HB*	TRANSVERSE TEST			DEFLECTION *Min* (mm)	CHEMICAL COMPOSITION
								Breaking Load, *Min* (kg)	Transverse Rupture Stress, *Min* MPa (kgf/mm²)	Distance Between Supports (mm)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Grades Comparable to FG 200 and FG 220 of IS : 210-1978												
INDIA	IS : 210-1978	FG 200	—	30	200	—	160-220	←————Optional————→				—
		FG 220	—	30	220	—	180-220	←————Optional————→				—
ISO	ISO/R 185-1961	20	—	30	200 (20)	—	—	—	—	—	—	—
UK	BS 1452 : 1961	12	⩽9·5	15·2	205 (20·5)	—	—	220	354 (36·4)	229	Not Specified	—
			>9·5 to 19	22·2	197 (19·7)	—	—	499	343 (35·3)	305		—
			>19 to 29·6	30·5	189 (18·9)	—	—	839	333 (34·3)	457		—
			>29·6 to 41·3	40·6	181 (18·1)	—	—	1 928	324 (33·4)	457		—
			>41·3	53·3	173 (17·3)	—	—	3 152	313 (32·3)	610		—
		14	⩽9·5	15·2	242 (25·2)	—	—	256	413 (42·3)	229	Not Specified	—
			>9·5 to 19	22·2	226 (23·6)	—	—	569	393 (40·3)	305		—
			>19 to 29·6	30·5	210 (22·0)	—	—	934	373 (38·3)	457		—
			>29·6 to 41·3	40·6	203 (21·3)	—	—	2 154	363 (37·3)	457		—
			>41·3	53·3	200 (20·5)	—	—	3 551	354 (36·4)	610		—
WEST GERMANY	DIN 1691-1964	GG-20	—	13	270 (28)	—	—	—	400 (41)*	—	—	—
			—	20	220 (23)	—	—	—	380 (39)*	—	—	—
			—	30	200 (20)	—	—	—	350 (36)*	—	—	—
			—	45	160 (16)	—	—	—	320 (33)*	—	—	—
FRANCE	NF A-32-101-1965	Ft 20	—	9	200 (20)	—	—	—	—	—	—	—
ISRAEL	SI 67-1973	20	—	20	230	—	—	—	390	400	—	—
			—	30	200	—	—	—	360	600	—	—
			—	45	160	—	—	—	330	900	—	—
USSR	GOST 1412-1954	СЧ 21-40	—	—	200 (21)	390 (40)	170-241	—	—	600	9	—
										300	3	—
SWEDEN	SIS 140 120-1976	0 120	—	—	200-300	—	160-210	—	—	—	—	Specified (*see* Note 3)

USA	ASTM A-48-1976	30 A	—	22·4	207	—	—	—	—	—	—	—
ITALY	UNI 5007-1969	G 20	3·5 to 7·5	15	250 (26)	—	235	—	—	—	—	—
			>7·5 to 15	30	200 (20)	—	205	—	—	—	—	—
			>15 to 30	60	150 (15)	—	175	—	—	—	—	—
			>30 to 50	90	120 (12)	—	155	—	—	—	—	—
CZECHO-SLOVAKIA	CSN 422420-1974	4224 20	4 to 8	15	250	—	200-260	—	—	—	—	P = 0·5 percent *Max* S = 0·15 percent *Max*
			>8 to 15	20	230	—	180-240	—	—	—	—	
			>15 to 30	30	200	—	160-220	—	—	—	—	
			>30 to 45	45	165	—	150-210	—	—	—	—	
			>45 to 80	60	145	—	140-200	—	—	—	—	
			>80 to 120	90	120	—	130-190	—	—	—	—	
JAPAN	JIS G 5501-1976	FC20 (Grade 3)	4 to 8	13	230 (24)	—	255 *Max*	200	—	—	2·0	—
			>8 to 15	20	210 (22)	—	235 *Max*	450	—	—	3·0	—
			>15 to 30	30	200 (20)	—	223 *Max*	900	—	—	4·5	—
			>30 to 50	45	170 (17)	—	217 *Max*	2 000	—	—	6·5	—

NOTE 1 — The values given in the table are in MPa. In case values are specified in any other unit in the relevant standard, its equivalent in MPa is specified and the original values are given in parentheses.

NOTE 2 — For the detailed requirements of a standard, the original specification should be referred.

NOTE 3 —

Grade	Ceq $\%C + \frac{\%Si}{4} + \frac{\%P}{2}$	C percent	Si percent	Mn percent	P_{Max} percent	S_{Max} percent
0 120	3·9-4·2	3·3-3·6	2·4-1·8	0·6-0·8	0·35	0·15

*Transverse strength is the average valuc.

(*Continued*)

TABLE 1 COMPARISON OF INDIAN AND OVERSEAS STANDARDS ON GREY IRON CASTINGS — *Contd*

COUNTRY/ INTERNATIONAL ORGANIZATION	STD DESIGNATION	GRADE	SECTIONAL THICKNESS OF CASTING (mm)	DIA OF CAST TEST BAR (mm)	TENSILE STRENGTH *Min* MPa (kgf/mm²)	BENDING STRENGTH *Min* MPa (kgf/mm²)	BRINELL HARDNESS *HB*	TRANSVERSE TEST			DEFLECTION *Min* (mm)	CHEMICAL COMPOSITION
								Breaking Load, *Min* (kg)	Transverse Rupture Stress, *Min* MPa (kgf/mm²)	Distance Between Supports (mm)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Grades Comparable to FG 260 of IS : 210-1978												
INDIA	IS : 210-1978	FG 260	—	30	260	—	180-230	←Optional→				—
ISO	ISO/R 185-1961	25	—	30	240 (25)	—	—	—	—	—	—	—
UK	BS 1452 : 1961	17	⩽9·5	15·2	290 (30·0)	—	—	292	473 (48·3)	229	2·28	—
			>9·5 to 19	22·2	273 (28·3)	—	—	653	453 (46·3)	305	3·30	—
			>19 to 29·6	30·5	258 (26·8)	—	—	1 034	433 (44·3)	457	5·08	—
			>29·6 to 41·3	40·6	242 (25·2)	—	—	2 445	414 (42·4)	457	4·06	—
			>41·3	53·3	226 (23·6)	—	—	3 937	393 (40·3)	610	5·59	—
WEST GERMANY	DIN 1691-1964	GG-25	—	13	320 (33)	—	—	—	—	—	—	—
			—	20	270 (28)	—	—	—	450 (46)*	—	—	—
			—	30	240 (25)	—	—	—	410 (42)*	—	—	—
			—	45	210 (21)	—	—	—	380 (39)*	—	—	—
FRANCE	NF A-32-101-1965	Ft 25	—	9	240 (25)	—	—	—	—	—	—	—
ISRAEL	SI 67-1973	25	8 to 15	20	280	—	—	—	460	400	—	—
			>15 to 30	30	250	—	—	—	420	600	—	—
			>30	45	210	—	—	—	390	900	—	—
USSR	GOST 1412-1954	СЧ 24-44	—	—	230 (24)	430 (44)	170-241	—	—	} 300	3	—
										} 600	9	—
SWEDEN	SIS 140 125-1976	0 125	—	—	250-350	—	180-230	—	—	—	—	Specified (*see* Note 3)
USA	ASTM A-48-1976	35 A	—	22·4	241	—	—	—	—	—	—	—

ITALY	UNI 5007-1969	G 25	3·5 to 7·5	15	300 (31)	—	250	—	—	—	—	—
			>7·5 to 15	30	240 (25)	—	220	—	—	—	—	—
			>15 to 30	60	200 (21)	—	195	—	—	—	—	—
			>30 to 50	90	160 (16)	—	170	—	—	—	—	—
CZECHO-SLOVAKIA	CSN 4224 25-1974	4224 25	4 to 8	15	300	—	220-280	—	—	—	—	P=0·5 percent *Max* S=0·15 percent *Max*
			>8 to 15	20	280	—	200-260	—	—	—	—	
			>15 to 30	30	250	—	180-240	—	—	—	—	
			>30 to 45	45	220	—	170-230	—	—	—	—	
			>45 to 80	60	195	—	160-220	—	—	—	—	
			>80 to 120	90	170	—	150-210	—	—	—	—	
JAPAN	JIS G 5501-1976	FC 25	4 to 8	13	270 (28)	—	269 *Max*	220	—	—	2	—
			>8 to 15	20	250 (26)	—	248 *Max*	550	—	—	3	—
			>15 to 30	30	240 (25)	—	241 *Max*	1 000	—	—	5	—
			>30 to 50	45	210 (22)	—	229 *Max*	2 300	—	—	7	—

NOTE 1 — The values given in the table are in MPa. In case values are specified in any other unit in the relevant standard, its equivalent in MPa is specified and the original values are given in parentheses.

NOTE 2 — For the detailed requirements of a standard, the original specification should be referred.

NOTE 3 —

Grade	Ceq $\%C + \frac{\%Si}{4} + \frac{\%P}{2}$	C percent	Si percent	Mn percent	P_{Max} percent	S_{Max} percent
0 125	3·7-4·0	3·2-3·5	2·1-1·5	0·6-0·8	0·25	0·15

*Transverse strength is the average value.

(*Continued*)

TABLE 1 COMPARISON OF INDIAN AND OVERSEAS STANDARDS ON GREY IRON CASTINGS — *Contd*

Country/ International Organization	Std Designation	Grade	Sectional Thickness of Casting (mm)	Dia of Cast Test Bar (mm)	Tensile Strength *Min* MPa (kgf/mm²)	Bending Strength *Min* MPa (kgf/mm²)	Brinell Hardness *HB*	Transverse Test			Deflection *Min* (mm)	Chemical Composition
								Breaking Load, *Min* (kg)	Transverse Rupture Stress, *Min* MPa (kgf/mm²)	Distance Between Supports (mm)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Grades Comparable to FG 300 of IS : 210-1978												
INDIA	IS : 210-1978	FG 300	—	30	300	—	180-230	←——Optional——→				—
ISO	ISO/R 185-1961	30	—	30	290 (30)	—	—	—	—	—	—	—
UK	BS 1452: 1961	20	≤9·5	15·2	336 (34·6)	—	—	329	532 (54·2)	229	2·54	—
			>9·5 to 19	22·2	321 (33·1)	—	—	737	513 (52·3)	305	3·81	—
			>19 to 29·6	30·5	305 (31·5)	—	—	1 225	492 (50·2)	457	5·84	—
			>29·6 to 41·3	40·6	290 (30·0)	—	—	2 789	473 (48·3)	457	4·83	—
			>41·3	53·3	273 (28·3)	—	—	4 522	453 (46·3)	610	6·35	—
WEST GERMANY	DIN 1691-1964	GG-30	—	20	320 (33)	—	—	—	—	—	—	—
			—	30	290 (30)	—	—	—	470 (48)*	—	—	—
			—	45	250 (26)	—	—	—	440 (45)*	—	—	—
FRANCE	NF A-32-101-1965	Ft 30	—	9	290 (30)	—	—	—	—	—	—	—
ISRAEL	SI 67-1973	30	—	20	330	—	—	—	—	400	—	—
			—	30	300	—	—	—	480	600	—	—
			—	45	260	—	—	—	450	900	—	—
USSR	GOST 1412-1954	Сч 28-48	—	—	270 (28)	470 (48)	170-241	—	—	300 600	3 9	— —
		Сч 32-52	—	—	310 (32)	510 (52)	187-255	—	—	300 600	3 9	— —
SWEDEN	SIS 140 130-1976	0 130	—	—	300-400	—	200-250	—	—	—	—	Specified (*see* Note 3)

USA	ASTM A-48-1976	40A	—	22·4	276	—	—	—	—	—	—	—
		45A	—	22·4	310	—	—	—	—	—	—	—
ITALY	UNI 5007-1969	G 30	3·5 to 7·5	15	—	—	—	—	—	—	—	—
			>7·5 to 15	30	290 (30)	—	235	—	—	—	—	—
			>15 to 30	60	260 (27)	—	215	—	—	—	—	—
			>30 to 50	90	200 (21)	—	190	—	—	—	—	—
CZECHO-SLOVA-KIA	CSN 4224 30-1974	4224 30	8 to 15	20	330	—	220-280	—	—	—	—	P = 0·30 percent *Max* S = 0·15 percent *Max*
			>15 to 30	30	300	—	200-260	—	—	—	—	
			>30 to 45	45	270	—	190-250	—	—	—	—	
			>45 to 80	60	245	—	180-240	—	—	—	—	
			>80 to 120	90	215	—	170-230	—	—	—	—	
JAPAN	JIS G 5501-1976	FC 30	8 to 15	20	300 (31)	—	269 *Max*	550	—	—	3·5	—
			>15 to 30	30	290 (30)	—	262 *Max*	1 100	—	—	5·5	—
			>30 to 50	45	260 (27)	—	248 *Max*	2 600	—	—	7·5	—

NOTE 1 — The values given in the table are in MPa. In case values are specified in any other unit in the relevant standard, its equivalent in MPa is specified and the original values are given in parentheses.

NOTE 2 — For the detailed requirements of a standard, the original specification should be referred.

NOTE 3 —

Grade	Ceq $\%C + \frac{\%Si}{4} + \frac{\%P}{2}$	C percent	Si percent	Mn percent	P_{Max} percent	S_{Max} percent
0 130	3·5-3·7	3·1-3·3	1·8-1·3	0·7-0·9	0·15	0·10

*Transverse strength is the average value.

(*Continued*)

TABLE 1 COMPARISON OF INDIAN AND OVERSEAS STANDARDS ON GREY IRON CASTINGS — *Contd*

COUNTRY/ INTERNATIONAL ORGANIZATION	STD DESIGNATION	GRADE	SECTIONAL THICKNESS OF CASTING (mm)	DIA OF CAST TEST BAR (mm)	TENSILE STRENGTH *Min* MPa (kgf/mm²)	BENDING STRENGTH *Min* MPa (kgf/mm²)	BRINELL HARDNESS *HB*	TRANSVERSE TEST			DEFLECTION *Min* (mm)	CHEMICAL COMPOSITION
								Breaking Load, *Min* (kg)	Transverse Rupture Stress, *Min* MPa (kgf/mm²)	Distance Between Supports (mm)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Grades Comparable to FG 350 of IS : 210-1978												
INDIA	IS : 210-1978	FG 350	—	30	350	—	207-241	←——Optional——→				—
ISO	ISO/R 185-1961	35	—	30	340 (35)	—	—	—	—	—	—	—
UK	BS 1452 : 1961	23	≤9·5	15·2	384 (39·4)	—	—	365	592 (60·2)	229	2·54	—
			>9·5 to 19	22·2	368 (37·8)	—	—	823	573 (58·3)	305	3·81	—
			>19 to 29·6	30·5	352 (36·2)	—	—	1 374	552 (56·2)	457	5·84	—
			>29·6 to 41·3	40·6	336 (34·6)	—	—	3 130	532 (54·2)	457	4·83	—
			>41·3	53·3	321 (33·1)	—	—	5 097	513 (52·3)	610	6·35	—
WEST GERMANY	DIN 1691-1964	GG-35	—	20	370 (38)	—	—	—	—	—	—	—
			—	30	340 (35)	—	—	—	530 (54)*	—	—	—
			—	45	300 (31)	—	—	—	500 (51)*	—	—	—
FRANCE	NF A-32-101-1965	Ft 35	—	9	340 (35)	—	—	—	—	—	—	—
ISRAEL	SI 67-1973	35	—	20	380	—	—	—	—	400	—	—
			—	30	350	—	—	—	540	600	—	—
			—	45	310	—	—	—	510	900	—	—
USSR	GOST 1412-1954	Сч 35-56	—	—	340 (35)	550 (56)	197-269	—	—	300	3	—
										600	9	—
SWEDEN	SIS 140 135-1976	0 135	—	—	350-450	—	220-260	—	—	—	—	Specified (*see* Note 3)
USA	ASTM A-48-1976	50 A	—	22·4	345	—	—	—	—	—	—	—

ITALY	UNI 5007-1969	G-35	3·5 to 7·5	15	—	—	—	—	—	—	—	—
			>7·5 to 15	30	340 (35)	—	255	—	—	—	—	—
			>15 to 30	60	310 (32)	—	235	—	—	—	—	—
			>30 to 50	90	260 (27)	—	210	—	—	—	—	—
CZECHO-SLOVA-KIA	CSN 4224 35-1974	4224 35	8 to 15	20	380	—	230-290	—	—	—	—	P = 0·25 percent *Max* S = 0·15 percent *Max*
			>15 to 30	30	350	—	210-270	—	—	—	—	
			>30 to 45	45	320	—	200-260	—	—	—	—	
			>45 to 80	60	295	—	190-250	—	—	—	—	
			>80 to 120	90	265	—	180-240	—	—	—	—	
JAPAN	JIS G 5501-1976	FC 35	15 to 30	30	340 (35)	—	277 *Max*	1 200	—	—	5 5	—
			>30 to 50	45	310 (32)	—	269 *Max*	2 900	—	—	7·5	—

NOTE 1 — The values given in the table are in MPa. In case values are specified in any other unit in the relevant standard, its equivalent in MPa is specified and the original values are given in parentheses.

NOTE 2 — For the detailed requirements of a standard, the original specification should be referred.

NOTE 3 — *Grade*

	Ceq $\%C + \frac{\%Si}{4} + \frac{\%P}{2}$	C percent	Si percent	Mn percent	P_{Max} percent	S_{Max} percent
0 135	3·3-3·5	3·0-3·2	1·5-1·1	0·8-1·0	0·10	0·10

*Transverse strength is the average value.

(*Continued*)

TABLE 1 COMPARISON OF INDIAN AND OVERSEAS STANDARDS ON GREY IRON CASTINGS — *Contd*

COUNTRY/ INTERNATIONAL ORGANIZATION (1)	STD DESIGNATION (2)	GRADE (3)	SECTIONAL THICKNESS OF CASTING (mm) (4)	DIA OF CAST TEST BAR (mm) (5)	TENSILE STRENGTH *Min* MPa (kgf/mm²) (6)	BENDING STRENGTH *Min* MPa (kgf/mm²) (7)	BRINELL HARDNESS *HB* (8)	TRANSVERSE TEST: Breaking Load, *Min* (kg) (9)	TRANSVERSE TEST: Transverse Rupture Stress, *Min* MPa (kgf/mm²) (10)	TRANSVERSE TEST: Distance Between Supports (mm) (11)	DEFLECTION *Min* (mm) (12)	CHEMICAL COMPOSITION (13)
Grades Comparable to FG 400 of IS : 210-1978												
INDIA	IS : 210-1978	FG 400	—	30	400	—	207-270	← Optional →				—
ISO	ISO/R 185-1961	40	—	30	390 (40)	—	—	—	—	—	—	—
UK	BS 1452 : 1961	26	⩽9·5 >9·5 to 19 >19 to 29·6 >29·6 to 41·3 >41·3	15·2 22·2 30·5 40·6 53·3	431 (44·1) 415 (42·5) 400 (41·0) 384 (39·4) 368 (37·8)	— — — — —	— — — — —	401 905 1 519 3 474 5 682	651 (66·1) 631 (64·1) 612 (62·2) 592 (60·2) 573 (58·3)	229 305 457 457 610	2·54 3·81 5·84 4·83 6·35	— — — — —
WEST GERMANY	DIN 1691-1964	GG-40	— —	30 45	390 (40) 350 (36)	— —	— —	— —	590 (60)* 560 (57)*	— —	— —	— —
FRANCE	NF A-32-101-1965	Ft 40	—	13	390 (40)	—	—	—	—	—	—	—
ISRAEL	SI 67-1973	40	— —	30 45	400 360	— —	— —	— —	600 570	600 900	— —	— —
USSR	GOST 1412-1954	Сч 38-60	—	—	370 (38)	590 (60)	207-269	—	—	} 300 600	3 9	— —
SWEDEN	SIS 140 140-1976	0 140	—	—	400-500	—	—	—	—	—	—	—
USA	ASTM A-48-1976	55 A 60	— —	22·4 22·4	379 414	— —	— —	— —	— —	— —	— —	— —
ITALY	—	—	—	—	—	—	—	—	—	—	—	—
CZECHOSLOVAKIA	—	—	—	—	—	—	—	—	—	—	—	—
JAPAN	—	—	—	—	—	—	—	—	—	—	—	—

NOTE 1 — The values given in the table are in MPa. In case values are specified in any other unit in the relevant standard, its equivalent in MPa is specified and the original values are given in parentheses.

NOTE 2 — For the detailed requirements of a standard, the original specification should be referred.

*Transverse strength is the average value.

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